Equality and diversity training pdf

Chapter 6Deservative selection and integration of sensors and predictors are crucial for the instrumentation of the mechatronic system. The characteristics of the ideal measuring device were discussed in Chapter 5. Although real sensors and transduts can behave very differently in practice, when developing a mechatronic system we need to use perfect behavior as a reference for design specifications. Academia.edu no longer supports the Internet Explorer.To browse the Academia.edu and the wider Internet faster and more securely, please take a few seconds to update the browser. Academia.edu uses cookies to personalize content, adapt ads, and improve user experience. Using our website, you agree to our collection of information using cookies. To learn more, check out our privacy policy.× 1. Department of Mechanical Engineering, JSS Academy of Technical Education, Bangalore-560060 MECHATRONICS (Course Code:18ME36B) 2. TEXT BOOKS - Electronic mechatronic control system in engineering and electrical engineering, W Bolton, Pearson Education, 1st ED., 2005. Mechatronics-Principles, Concepts and Applications, Nitaigour Premchand Mahalik, Tata McGraw Hill, 1st Edition, 2003 REFERENCE BOOKS: - Mechatronics hmT Ltd. - Tata McGrawHill, 1st Edition, 2000 Further Reference Edition: National Advanced Learning Technology Program (NPTEL) Dr. N. N. Joshi (IGIT) Understand the evolution and development of mechatronics as a discipline. To justify the need for interdisciplinary research in technological education. Understand the use of microprocessors in different systems and know the functions of each element - demonstrate the philosophy of integration with Mechatronics technology in mind. Learning Goals 4. Illustrate the various components of Mechatronics systems. Evaluate the different control systems used in automation. Development of mechanical, hydraulic, pneumatic and electrical control systems. Results 5. MECHATRONICS Chapter 1: Introduction to Mechatronics 6. Module 1 Introduction: Definition, Multidisciplinary Scenario, Evolution of Mechatronics, Mechatronics System Design, Targets, Advantages and Disadvantages of Mechatronics Transducers and Sensors: Definition and Classification of Previews,Difference Between a Transdoucier and Sensor, Identification and Classification of Sensors, How Light Sensors, Proximity Switches and Hall Effect Sensors. 7. INTERVIEW - mechatronics - a concept of Japanese origin (1970s). The term Mechatronics, coined by Tetsuro Mori. It is defined as the use of electronics and computer technologies to control the movements of mechanical systems. 8. INTERVIEW is a multidisciplinary approach to product and production systems design. It includes the use of electrical, mechanical, computer engineering to develop products, processes and systems with greater flexibility, ease in redesign and reprogramming ability. 9. INTERVIEWER - It simultaneously includes all these disciplines. 10. INTRODUCTION Examples of predominantly mechanical Ball Valve Bimetallic Stripe 11 devices. WARNING Examples of Mechatronics System - Domestic washing machines Cars are equipped with a safety system - Installations such as air bags - Parking sensors (closeness) - Anti-fuel electronic keys - Autofocus, auto-exposure, etc. 12. INTERVIEWER Examples of mechatronics system 13. INTERVIEWER Examples of the Mechatronics System 14. INTERVIEWER Examples of mechatronics system 15. INTERVIEWER Examples of mechatronics system 16. THE importance of mechatronics in automation - Today's customers demand more variety and a higher level of flexibility in products - Requirements and competition in the market - It is necessary to automate the production and assembly operations of the product. 17. Introduction Evolution of the second level of the second level of the fourth level includes I/O devices such as sensors and drives, integrates electrical signals with mechanical action. For example, liquid valves and repeaters integrate microelectronics into electrical devices. For example: a cassette player includes advanced backup channel features. Smart systems such as hard drive, CD drives, automatic washing machines Intelligent control in the mechatronic system, such as fault detection and insulation detection systems (FDI). 18. FIRST The key elements in the Mechatronics 19 system. INTERVIEWER The main elements in the mechatronics system 20. INTERVIEWER The main elements in the mechatronics system - drives produce movement. Sensors detect the state of the system's parameters, inputs and exits. Digital devices control the system. Air conditioning and interfaic circuits provide a link between control schemes and I/O devices. Graphic displays provide visual feedback to users. 21. FIRST Key elements in the Mechatronics system and drives: DC engines; Stepper motors; Servomotor; Hydraulics; Pneumatics. Sensors: switches; Potentiometer, Strain guage, Thermocouple; accelerometer, etc. - signal conditioning and interaction: discrete circuits; Amplifiers, filters; A/D, D/D. - Digital Management Architectures: Logical Schemes; Microcontroller, PLC, sequencing and timing, - output signal air conditioning and interphasing: D/D, A/D; Amplifiers, power transistors; Power Opamps. 22. Embedded INTRODUCTION Systems - The term built-in system refers to where microprocessors are embedded in systems. The microprocessor is a set of logical gates and memory elements that are not connected as separate components, but logical functions are implemented using Ensure. Built-in is a microprocessor system that is designed to manage a number of functions. Not designed for programming by end users, for example: washing machine, engine control, ABS, FIP, cell phone 23. Design process 1. Need 2. Problem analysis 3. Preparing specification 4. Generation of Possible Solutions 5. Choosing the right solution 6. Production of detailed design 7. The production of working drawings The design process for any system involves a number of steps. The design process for mechatronic systems; One step is to create a system model that predictions can be made in relation to its behavior with reference to input. System: a box or block chart that has an entry and exit. Only the relationship between exit and entrance applies. For example, Systems 25. The Mechatronic Design Process of the Mechatronic Design Process consists of three stages: - Modeling and Modeling - Prototyping - Deployment / Life Cycle 26. Mechatronic Design Process 27. The pros and cons of Mechatronics Benefits Disadvantages Are Cost effective and Reliable Product High Initial Cost System. A high degree of flexibility and performance is required to have knowledge of different engineering areas for design and implementation. A great deal of machine use. The specific problems of the different systems will have to be addressed separately and appropriately. Reduce capital expenditures by integrating complex systems. Expensive to incorporate mechatronics approach to the existing/old system 28. MECHATRONICS Chapter 1: Transduzers and Sensors 29. Predictors and sensors - Definition and classification of previews. The difference between the preduce and the sensor. Identify and classify sensors. How light sensors work and apply. - Proximity switches and Hall effect sensors. 30. Sensors of automotive sensors 31. Sensors are an element that produces a signal that relates to the amount measured. An input device that provides a output (signal) in relation to a certain physical quantity. A device that converts signals from a single energy domain to an electric domain. Sensors 33. Set indicator: The spindle indicating acts as a bias sensor/detector. The Bourdon tube of the pressure sensor is twofold: first, to feel the pressure, secondly, to give an exit in the form of displacement. Here the tube acts sensor / detector of the predictor. Load compression cell: The platform detects force and gives an output in the form of a deviation. This deviation can be further converted into an electric output by voltage sensors (the so-called secondary converter). Sensors Examples 34. Sensors and sensors that, combined with signal conditioning and microprocessors, are called smart sensors. Smart Smart Sensor Applications - Communications - Computing - Multi-feeling - Self-calibration 35. Normal sensors have three critical parts that are the sensing element (Transistor, capacitors, Photo Diode, etc.). Signals and processing. The sensor interface. 36. Sensors Classification Is classified by the following criteria: 1. Primary input (Measurand) 2. Principles of transduction (use of physical and chemical effects) 3. Material and Technology 4. Real Estate 5. Appendix 37. Classification of sensors and active sensors: Active sensors are those that require an external arousal signal or a power signal. For example: LiDAR (light detection and range), photoconducting cells. Passive sensor: Does not require an external power signal and directly generates a output response. For example: Radiometers, filming based on detection tools - Some of the detection tools are electrical, biological, chemical, radioactive, etc. 38. Classification of sensors and sensors that are commonly used in different applications. All of these sensors are used to measure one of the physical properties such as temperature, resistance, capacity, conductivity, thermal transmission, etc. Classification of sensors based on the phenomenon of transformation, i.e. input and output. Some of the conversion phenomena are photovoltaic, thermoelectric, electrochemical, electromagnetic, thermooptic, etc. - Analog sensors: Produce analog output. Digital sensors: working with discrete or digital data. 40. The principle of light sensors (passive) light sensors are photovoltaic devices / Photosensors that convert light energy (photons), whether visible or infrared light into an electric signal. Photo dealers Apps Smoke Detectors, CD players and TVs, remote control in VCRs, radio clock, street light 41. The principle of light sensors (Passive) is a semiconductor node connected in a chain in the opposite direction, giving a very high stability. Without accidental light, the reverse current is almost insignificant and is called a dark current. When light falls on the joint, additional pairs of electron holes are produced and the reverse current increases and the diode resistance drops. The reverse current is almost proportional to the intensity of light. Photodiodes 42. The principle of light sensors (passive) Phototranstors - Phototransistors have a light-sensitive collector-basic p-n connection. When there is no random light, there is a very small collector to the emitters. When the light is light Incident, the base current is produced, which is directly proportional to the intensity of the light. This leads to the production of the collector's current, which is a measure of light intensity. The phototransistor is connected to Darlington with a conventional transistor, for a higher current gain. In electronics, the multi-story configuration is called Darlington Steam 43. Photoresister: Photoresister (or light-dependent resistor, LDR or photoconducting cell) is a light-conmitting variable resistor. Resistance to the photo resistor decreases with the increase in the intensity of the light of the incident (photoconductivity). The principle of light sensors (passive) 44. PhotoResistent: The principle of light sensors (Passive) - As the light energy falling on the photo-conducting material increases, the number of valence electrons that gain energy and leave a connection with the nucleus increases. This results in a large number of valence electrons jumping into a conduction band, ready to move using any external force, such as an electric field. 45. Application of photo-tester: The principle of light sensors (passive) - Automatic street lights - Light meters in the camera - Light sensors - Radio Watch 46. The proximity sensor switches proximity sensor, which can detect the presence of nearby objects without physical contact. The microsema is a small electric switch that requires physical contact and a small operating force to close the contacts. For example: conveyor belt. 47. The principle of the proximity switches (a) switches controlled by levers (b) roller (c) cams. 48. Principle of the Switches Proximity Reed Switch - It consists of two magnetic switch pins sealed in a glass pipe. When the magnet is close to the switch, the magnetic reeds are attracted to each other and close the switch contacts. It's a contactless proximity switch. Apps: Check door closing, used with tachometers, etc. 49. Hall Effect Sensor Effect Sensor Hall effect is a device that is used to measure the magnitude of the magnetic field. Its output voltage is directly proportional to the magnetic field force through it. Hall Effect Sensors are used to sensing, positioning, detecting speed and applying the current sensing principle - When a beam of charged particles passes through a magnetic field, the forces act on the particles and the beam deviates from its straight line of path. This effect was discovered by E.R. Hall in 1879 and is called the Hall Effect. 50. Hall Effect Sensors Work - Consider electrons moving in conductive plates with a magnetic field, on application at right angles to the plane of the plate. As a result of the magnetic field, moving electrons deviate to one side of the plate, and this side becomes charged, while the opposite side becomes positively charged, as the electrons are directed away from it. This charge division produces an electric field in the material. The separation of the charge continues until the forces on the charged particles from the electric field balance the forces produced by the magnetic field. 51. The hall effect sensors - the result is a transverse potential V difference, which is given by the density of magnetic flow I - the current KH - the constant holl ratio t' thickness of the plate 52. Hall Effect Sensors - Fluid Level Detector Of the Application Wheel, containing two magnets passing by the Hall Effect sensor, sensing position - Automotive Fuel Level Indicator - Keyboard Switch 53. Transdooker / Gauges / Signal Generators / Pickups 54. Transduser/Gauges/Signals Generators/Pickups - A device that converts changes in physical quantity, such as pressure or brightness, into an electrical signal, or vice versa. The converter is an electronic device that converts energy from one form to another. For example, microphones, loudspeakers, thermometers, position and pressure sensors, as well as the TransducerPhysical ty antenna. Excitation Electrical Output 55. Transdubor mechanical detector-transductor elements; 1. Resilient members/elements 2. Elements of Mass Sensing 3. Heat detectors 4. Mechanical DETECTOR -TRANSDUCER ELEMENTS 56. MECHANICAL DETECTOR -TRANSDUCER ELEMENTS Elastic members/elements: Works on the principle of direct voltage or compression, bending and xersion. Common elastic members/elements - Proof ring (stress ring). - Resilient member of the Heart - Springs - Burdon tube, Whitebeard, diaphragm 57. MECHANICAL DETECTOR -TRANSDUCER ELEMENTS Elements of Mass Sensing Elements: Works on the principle of concentrated mass inertia Common mass sensing members/elements are Accelerometers. Vibration pickups and gauges 58. MECHANICAL DETECTOR -TRANSDUCER ELEMENTS Heat Detectors: Temperature Measuring Devices Common Heat Detectors; Glass thermometers. Pressure sensor thermometers - Bimetallic thermometers - Resistance thermometers - Termistors - Pyrometers and Thermocouples. 59. MECHANICAL DETECTOR -TRANSDUCER ELEMENTS Hydro-pneumatic sensors: Temperature Measurings Common Hydro-Pneumatic Sensors; Static Conditions Dynamic Conditions - Simple Float - Hydrometer - Holes and Venturi - Pitot Tube - Vanessa 60. Transduceators and mechanical converters: Converting physical quantities into mechanical. Electric converters: Transformers that convert physical quantities into electric ones. For example, a thermocomp that changes temperature changes into a slight voltage. Linear differential transformer (LVDT), used to measure the classification of transducer bias 61. 61. Classification of transducers Active Transducer Analogue based on the type of withdrawal Passive transducer Digital 62. Classification of transduceators Based on the electrical principle of variable resistance type - Tension - Pressure sensors - Termistors - RTD - Photoconducting type of variable cell induction - LVDT - Reluctance of pickup - Eddie current track variable cap-type - Capacitor microphone - Pressure sensor - Dielectric sensor. Voltage generating type - Thermocouple - Piezoelectric pickup - Photovoltaic cell - Rotating motion tachometer voltage-divider type - pressure-activated voltage divider. The position sensor is a potentiometer. 63. Active Transductor Passive Transductor Analog digital self-generating types of previews. They develop their own tension or current. A transducer with external food. Can absorb energy. Convert input into analog data. O/p is a continuous function of time. Conversion of input into electrical power in the form of pulse classification of transducers - thermocuple, piezoelectric pickup, photovoltaic elements - RTD, Thermistor, DT, Photoemission cell - Thermocouple, Strain gauge, LVDT 64. Terms associated with transduction sensitivity of transductioners: the link between mezuran and the signal of the withdrawal of the predecessor. The sensitivity of the preinduser should be as high as possible for lighter measurements. Conditions related to specifications for transdusers and bands. Sensitivity. The square system. Maximum working temperature - linearity and isture- Temperature zero drift - Cooling method used - Mounting parts - Maximum depth. Exit for zero input. Natural frequency. 66. The difference between transducer sensors and transducers is the elements where physical changes change accordingly. Sensors - The term sensor is used for an element that generates a signal proportional to the amount measured. The difference between sensors and transdutzators is 68. The difference between the sensor and the fundamental converters for comparing the Transducer sensor Is the definition of feelings physical changes occur in the surrounding and converting it into a readable amount. A transformative device that, when activated, converts energy from one form to another. The sensor components of the sensor itself and the signal conditioning function detects changes and triggers appropriate electrical signals. Converting one form of energy into another. Examples of Proximity Sensor, Magnetic Sensor, Accelerometer Sensor, Light Sensor, Barometer, Gyroscope, etc. Termistor, Potentiometer, Thermocuple, etc. 69. The end of the module equality and diversity training online. equality and diversity training online free. equality and diversity training nhs. equality and diversity training pdf. equality and diversity training uk. equality and diversity training materials free. equality and diversity training courses. equality and diversity training free