Manhole Digging Robotics

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***Abstract*—Simultaneous control of position and force of robots is one of the difficult and important problems in the field of robotics. Even if we can get a desirable positional trajectory of robots' end effectors or tools that they use, it is not easy to know how much force we should apply in order to execute planned tasks. We propose a method that enables robots to exert the required force to successfully carry out tasks. In this paper, we introduce a method to realize online updating of the force applied to the environment through tools and modification of Center of Gravity (CoG) based on the reference force. The update direction of the force is set in advance considering the interaction between tools and environment. We take manipulation of a digging.**

I. INTRODUCTION

HIS process consists of the humanoid robotics. Because Thumanoid robots are made to imitate the shape of humans, they are expected to carry out same work as humans. In various kinds of work, humans use tools to achieve their goals. However, there are a lot of difficulties for humanoid robots to use tools. Control of position and force of tools is one of them.

A. Review Stage

This process we are attempted to the doing that to declare the that humanoid robots are involved in the establishing of the digging holes in the earth surface.

B. Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used in the text, even after they have already been defined in the abstract. Abbreviations such as IEEE

II. 1.1 PROBLEM STATEMENT: DESIGN AND DEVELOPMENT OF AN AGRICULTURAL ROBOT, WHICH CAN BE ABLE TO PLOUGH AND DISPENSE SEEDS IN AGRICULTURAL FIELD. THE CONTROL OF THIS AGRO-BOT SHOULD BE WIRELESS AND CAN BE ABLE TO SHOW DIGGING AND SEEDING OPERATIONS. FABRICATE THE MODEL OPERATED BY WIRELESS CONTROL WHICH ABLE TO SHOW OPERATIONS LIKES PLOUGHING AND SEEDING. ALSO DESIGN AND ANALYSE A REAL TIME SYSTEM FOR THIS ROBOT TO GIVE A SOLUTION AND PROPOSE A MODEL WHICH CAN BE USED IN REAL TIME FIELD. 1.2 OBJECTIVES:• DESIGN AND DEVELOPMENT OF AN AGRICULTURAL ROBOT WHICH CAN BE ABLE TO PLOUGH AND DISPENSE SEEDS IN AGRICULTURAL FIELD. • CONTROL OF THIS AGRO-BOT WILL BE WIRELESS. • DESIGN AND ANALYZE A REAL TIME SYSTEM FOR THIS ROBOT TO GIVE A SOLUTION AND PROPOSE A MODEL WHICH CAN BE USED IN REAL TIME FIELD. • ANALYZE THE DESIGN OF PLOUGH TOOL AND DEVELOP FOR REAL TIME SYSTEM. • TO PROPOSE A LOW COST BUT EFFECTIVE REAL TIME AGRO-BOT SYSTEM. • TO DEMONSTRATE THE WORKING MODEL OF THIS AGRO-BOT. 1.3 SCOPE BY USING THIS ROBOT IN THE FIELD OF AGRICULTURE IT CAN HELP THE FARMERS IN THE INITIAL STAGE OF AGRICULTURE. I.E., DURING DIGGING AND SEED SOWING. THIS ROBOT IS A SMALL SCALE EFFORT BUT THE SAME CAN BE IMPLEMENTED WITH ENORMOUS RESULTS IN A LARGE SCALE THAT BENEFITS ALL FARMERS. APART FROM PLOUGHING, SEED DISPENSING, SPRAYING PESTICIDES AND FRUIT PICKING OTHER FARMING PROCESS LIKE HARVESTING, IRRIGATION ETC. CAN ALSO BE IMPLEMENTED IN ONE ROBOT THUS MAKING THE MACHINE CAPABLE OF MULTI-TASKING. ALSO LOOKING FORWARD TO LEARN ABOUT AND IMPLEMENT AGRICULTURAL BASED AGRO-BOTS LIKE NURSERY BOT, HERDER BOT, WINE BOT, BEE BOT, AND HAMSTER BOTS THAT WOULD QUALIFY THE STANDARDS FROM THE CURRENT PRECISION TO AUTONOMOUS FARMING METHODOLOGIES. THIS ROBOT CAN BE A BETTER SUBSTITUTE FOR THE HUMAN WHO PERFORMS THE SEEDING AND FERTILIZING. THIS ROBOT IS VERY USEFUL FOR THE FARMERS WHO ARE INTERESTED TO DO AGRICULTURE ACTIVITY BUT FACING THE LABOUR PROBLEM. 2. METHODOLOGY THE ASSEMBLY OF THE ROBOTIC SYSTEM IS BUILT USING HIGH TORQUE DC MOTOR, COMMUNICATION MODULE, RELAY DRIVER CIRCUIT, BATTERY PACKAGE, MICROCONTROLLER WHICH IS SHOWN IN BLOCK DIAGRAM BELOW. WHEN DC MOTOR IS STARTED, THE VEHICLE MOVES ALONG THE PARTICULAR COLUMNS OF PLOUGHED LAND FOR DIGGING AND SOWING THE SEEDS AND ITS MOVEMENT IS CONTROLLED BY REMOTE GUIDING DEVICE. THE REMOTE CONTROL TRANSMITTER AND RECEIVER IS SHOWN IN BLOCK DIAGRAM BELOW. INTERNATIONAL CONFERENCE ON IDEAS, IMPACT AND INNOVATION IN MECHANICAL ENGINEERING (ICIIIME 2017) 2.1 **COMPONENTS THIS ROBOT IS DIVIDED INTO TWO MODULES. 1. MECHANICAL MODULE. 2. ELECTRONIC MODULE.** • MECHANICAL MODULE: THE MECHANICAL PARTS OF THE ROBOT ARE DESIGNED WITH THE HELP OF PRO-E DESIGN SOFTWARE. THE MECHANICAL MODULE OF THE ROVER CONSISTS OF, • SEED STORAGE AND DISPENSER. • SLOUGHING UNIT. • CHASSIS. • DRIVE UNIT (DC MOTORS). • WHEELS. • ELECTRONIC MODULE

III. CALCULATIONS

IV. 1. CALCULATION OF SPUR GEAR PITCH LINE VELOCITY = R= N=100 TO130RPM WE HAVE TAKEN N=130RPM.AND PITCH LINE VELOCITY IS 3 M/S FOR 130 RPM R= R=0.22M P= --------- (2) TORQUE(T)=FORCE*R T=32.37NM THEREFORE, THE TORQUE VALUE USE IN EQUATION NO. (2) P= P=440.67W SELECT 20-DEGREE FULL DEPTH INVOLUTE GEAR FOR THAT TEETH ON PINION IS18. TP=18 THEREFORE, THE TORQUE VALUE USE IN EQUATION NO. (1) V= = V=122.52MM/S

V=0.122M/S ASSUMING STEADY LOAD CONDITIONS AND 8-10 HRS. OF SERVICE PER DAY. SERVICE FACTOR IS GIVEN BY CS=1 WE KNOW THE DESIGN TANGENTIAL TOOTH LOAD WT= *CS ---------- (3) = *1 WT=361.04N/M & VELOCITY FACTOR, CV= FOR 20-DEGREE FULL DEPTH INVOLUTE GEAR CV= WE KNOW THAT TOOTH FROM FACTOR FOR THE PINION, TP=18 THEREFORE, THE TORQUE VALUE USE IN EQUATION NO. (1) V= = V=122.52MM/S V=0.122M/S ASSUMING STEADY LOAD CONDITIONS AND 8-10 HRS. OF SERVICE PER DAY. SERVICE FACTOR IS GIVEN BY CS=1 WE KNOW THE DESIGN TANGENTIAL TOOTH LOAD WT= *CS ---------- (3) = *1 WT=361.04N/M & VELOCITY FACTOR, CV= FOR 20-DEGREE FULL DEPTH INVOLUTE GEAR CV= WE KNOW THAT TOOTH FROM FACTOR FOR THE PINION,

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VI. CONCLUSION

A conclusion section is that the robot is used for the function of digging holes in the earth surface in the precise condition.

REFERENCES

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