KOKKUVÕTE

Töö eesmärk oli luua roboti vähendatud mudel nii õppe kui ka ettevõtte tarbeks. Töös tehtud etappide põhjal saab tuua mõned järeldused ning välja tuua ka kohad, mida oleks saanud täiendada ning mis tuli kohe alguses hästi välja.

Teises peatükis oli juttu erinevatest 3D printimise tehnoloogiatest ning nende põhimõtetest. Kolmandas peatükis toodi välja 3D printimise teenusepakkujad ning ka roboti mudelite lahenduse pakkujatest.

Neljas peatükk laskus skaala valikusse ning roboti mudeli muutmise lähteülesande püstitamisse. Toodi välja sagedamini kasutatavad mudelite skaalad ning ka kohad, kust võib leida täissuuruses roboti 3D mudeleid. Püstitati ka põhimõtted, mille põhjal roboti 3D mudeli muutmine käima peaks.

Viiendas peatükis leiti iga roboti lülile lahendus, et mudel ka hiljem liigutatav oleks. Lülide projekteerimisega saab rahule jääda, kuigi arvan, et on olemas ka paremaid lahendusi. Polt-mutter liide võib inetu välja näha ja mudelit liigutades võib ennast lahti keerata. Liidete avade valik oli loogiline ning sobilik. Samas peatükis käsitleti ka roboti vähendatud mudeli koostu loomine ning robotjaama mudelite paigutamine CAD keskkonda.

Kuues peatükk tõi välja mudelite 3D printimiseks ettevalmistamise. Lühidalt toodi välja STL faili olemus ja vajadus 3D printimisel. Samuti käsitleti ka SolidWorks keskkonnas mudeli STL formaati viimist.

Seitsmendas peatükis analüüsiti majanduslike kulusid ning ajakulusid. Enne 3D printimise maksumuste väljatoomist kirjeldati erinevaid materjale, ning seejärel võrreldi erinevate materjalide maksumust. Lisaks on näha ka robotjaama mudelite printimise maksumused ning ka värvide maksumused. Materjalide suhtes on näha, et polüamiid on odavaim materjal 3D printimiseks.

Üleüldiselt saab tehtud tööga rahule jääda ning õppisin ka töö tegemise käigus uusi teadmisi. Kindlasti oli töö tegemise juures kõige huvitavam osa roboti mudeli telgede projekteerimine. Vaja läks loogilist mõtlemist kui ka arusaamist roboti lülide liikumisest.

Summary

The aim of the work was to create a reduced model of a robot for both learning and industrial use. Based on the stages made in the work, some conclusions can be drawn and some points where it could have been better and some, which came out well at the beginning.

The second chapter talked about different 3D printing technologies and their principles. The third chapter brings out the 3D printing service providers as well as the robot model solution providers.

The fourth chapter went into the choice of scale and the initial task of changing the robot model. The most frequently used model scales were pointed out, as well as the sources where full-size 3D models of the robot can be found. The principles of changing the robot's 3D model were also pointed out.

In the fifth chapter, a solution was found for each robot link so that the model could be functional later. I am satisfied with the design of the links, although I think there are better solutions. The bolt-nut connection may look out of place and it may unscrew itself as you move the model. The choice of connection openings was logical and appropriate. The same chapter also discussed the creation of a reduced robot model assembly and the placement of robot station models in a CAD environment.

Chapter six highlighted the preparation of models for 3D printing. The nature of the STL file and the need for 3D printing was briefly pointed out. Converting the model to STL format in SolidWorks was also discussed.

The seventh chapter analyzed economic costs and time costs. Before outlining the cost of 3D printing, different materials were described, and then the cost of different materials was compared. In addition, the costs of printing the robot station models and the costs of colors

can be seen. In terms of materials, it can be seen that polyamide is the cheapest material for 3D printing.

In general, I can be satisfied with the work done, and I also learned new knowledge while doing the work. Certainly the most interesting part of the thesis was the design of the axes of the robot model. What was needed was logical thinking as well as an understanding of the movement of the robot's links.