Sigmascreening B.V.
Meibergdreef 5, 1105 AZ Amsterdam, The Netherlands
Hengelosestraat 500, Building The Gallery, Enschede, The Netherlands
www.sigmascreening.com

12 – 30 weeks project for student of technology / engineering:

Mammography research setup – stepper motor controller

Background

Sigmascreening is an innovation company in mammography (breast x-ray photo). For good quality x-ray photos without blurring, the breast needs to be immobilized. Many people consider this "compression" quite painful, particularly women with smaller breasts. Normal mammography machines only display the compression force, but using the same force for a large or small breast results in very different pressures (force per square centimetre). Our Sensitive Sigma Paddle measures the contact area of the compression plate with the breast and calculates the mean pressure. With 8 LEDs as a display, the technician is guided to apply the same level of pressure – corresponding to normal blood pressure - for all different sizes and shapes of breast. This has been proven to reduce pain experience without loss of image quality. In R&D, Sigmascreening collaborates with the Bioengineering and medical Physics department of the Amsterdam UMC (Location AMC).

Project

For a mammography research setup, the motorized breast compression plate (already built) and the breast support table (still to build) need to be programmed to move up and down with independently controllable speeds. The motor controller needs to work together with two sensor inputs that measure the forces on the breast. A user interface has to display compression information and has to allow the operator to change motor speed settings. The research unit will be used on (silicone) breast phantoms to test that everything functions safely.

Profile

Student of technology or engineering (mechanical, electrical, physics, computer)

- Proven: experience with Rasberry Pi hardware and software (Raspbian OS)
- Proven: experience with DC stepper motor controllers
- Proven: experience with programming in Python or another common language
- Ideally: experience with programming a user interface to display and change settings
- Ideally: experience with mechanical construction, in particular: small scissor platform
- Ideally: experience with electrical construction of a handheld switch for controlling the motor
- Ideally: experience with serial readout of sensors, in particular: a postal weighing scale
- Able to work in a team, verbally present ideas & results and write a comprehensive report

Scope

Suitable as an internship or Master thesis-project of a minimum of 12 weeks (can be extended to include more tasks up to a project of 30 weeks)

Contact

Dr. ir Jerry de Groot: jerry.degroot@sigmascreening.com, 020 566 5388

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12 – 30 weeks project for student of technology / engineering:

Mammography research setup – new type of contact area sensor

Background

Sigmascreening is an innovation company in mammography (breast x-ray photo). For good quality x-ray photos without blurring, the breast needs to be immobilized. Many people consider this "compression" quite painful, particularly women with smaller breasts. Normal mammography machines only display the compression force, but using the same force for a large or small breast results in very different pressures (force per square centimetre). Our Sensitive Sigma Paddle measures the contact area of the compression plate with the breast and calculates the mean pressure. With 8 LEDs as a display, the technician is guided to apply the same level of pressure – corresponding to normal blood pressure - for all different sizes and shapes of breast. This has been proven to reduce pain experience without loss of image quality. In R&D, Sigmascreening collaborates with the Bioengineering and medical Physics department of the Amsterdam UMC (Location AMC).

Project

For a mammography research setup, the current capacitance-based Sigmascreening contact area sensor will be replaced with a different type of contact area sensor. The high-level readout and data processing of this type of sensor needs to be implemented to obtain an output related to the contact pressure on the breast. The research unit with new contact area sensor will be used on (silicone) breast phantoms to determine the sensor precision and accuracy and to test that everything functions safely.

Profile

Student of technology or engineering (electrical, physics, computer)

- Proven: experience with (serial) readout of sensors
- Proven: experience with programming in Python or another common language
- Ideally: experience with light image processing
- Ideally: experience with programming a user interface to display and change settings
- Ideally: experience with Rasberry Pi hardware and software (Raspbian OS)
- Able to work in a team, verbally present ideas & results and write a comprehensive report

Scope

Suitable as an internship or Master thesis-project of a minimum of 12 weeks (can be extended to include more tasks up to a project of 30 weeks)

Contact

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12 – 30 week project for student of technology / engineering / arts:

Mammography research – flexible breast phantoms

Background

Sigmascreening is an innovation company in mammography (breast x-ray photo). For good quality x-ray photos without blurring, the breast needs to be immobilized. Many people consider this "compression" quite painful, particularly women with smaller breasts. Normal mammography machines only display the compression force, but using the same force for a large or small breast results in very different pressures (force per square centimetre). Our Sensitive Sigma Paddle measures the contact area of the compression plate with the breast and calculates the mean pressure. With 8 LEDs as a display, the technician is guided to apply the same level of pressure – corresponding to normal blood pressure - for all different sizes and shapes of breast. This has been proven to reduce pain experience without loss of image quality. In R&D, Sigmascreening collaborates with the Bioengineering and medical Physics department of the Amsterdam UMC (Location AMC).

Project

For ongoing mammography research, Sigmascreening is in need of a set of flexible breast phantoms to use for experiments on a mammography research setup. The set of breast phantoms should represent a range of actual breast shapes that can either be rendered from an existing breast model (available from literature), or that can be recorded with a 3D scanner (not yet available). In the set of breast phantoms there should be differences in firmness inside the breast, which can be constructed via 3D printing, silicone moulding or another 3D sculpting technique.

Profile

Student of technology or engineering (mechanical, physics, electrical, computer)
Or: Student or arts (sculpting, 3D photography, computer modelling)

- Proven: experience with 3D printing, silicone moulding or other 3D sculpting technique
- Proven: experience with 3D modelling in Blender or another mesh-based program
- Ideally: experience with (structured light) 3D scanning
- Able to work in a team, verbally present ideas & results and write a comprehensive report

Scope

Suitable as an internship or Master thesis-project of a minimum of 12 weeks (can be extended to include more tasks up to a project of 30 weeks)

Contact

Dr. ir Jerry de Groot: jerry.degroot@sigmascreening.com, 020 566 5388

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20 – 40 week project for student of technology / engineering:

Mammography research – Finite Element breast model

Background

Sigmascreening is an innovation company in mammography (breast x-ray photo). For good quality x-ray photos without blurring, the breast needs to be immobilized. Many people consider this "compression" quite painful, particularly women with smaller breasts. Normal mammography machines only display the compression force, but using the same force for a large or small breast results in very different pressures (force per square centimetre). Our Sensitive Sigma Paddle measures the contact area of the compression plate with the breast and calculates the mean pressure. With 8 LEDs as a display, the technician is guided to apply the same level of pressure – corresponding to normal blood pressure - for all different sizes and shapes of breast. This has been proven to reduce pain experience without loss of image quality. In R&D, Sigmascreening collaborates with the Bioengineering and medical Physics department of the Amsterdam UMC (Location AMC).

Project

For ongoing mammography research, Sigmascreening is in need of a finite element model of the female breast to visualize strain and stresses during mammographic breast compression. The model needs to be compared to phantom measurements and/or clinical data. A preliminary study on a homogenous model has been performed at the Technical University of Eindhoven. Continuation of this project would consist of a heterogeneous model, ideally including friction boundary condition and viscoelastic component.

Profile

Student of technology or engineering (mechanical, physics, computer)

- Proven: experience with finite element modelling of biological material, in particular soft tissue
- Ideally: experience with a freeware / GNU-licenced FEM software package
- Able to work in a team, verbally present ideas & results and write a comprehensive report

Scope

Suitable as an internship or Master thesis-project of a minimum of 20 weeks (can be extended to include more tasks up to a project of 40 weeks).

Contact

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20 – 40 week project for student of technology / engineering:

Mammography research – Neural network image classifier

Background

Sigmascreening is an innovation company in mammography (breast x-ray photo). For good quality x-ray photos without blurring, the breast needs to be immobilized. Many people consider this "compression" quite painful, particularly women with smaller breasts. Normal mammography machines only display the compression force, but using the same force for a large or small breast results in very different pressures (force per square centimetre). Our Sensitive Sigma Paddle measures the contact area of the compression plate with the breast and calculates the mean pressure. With 8 LEDs as a display, the technician is guided to apply the same level of pressure – corresponding to normal blood pressure - for all different sizes and shapes of breast. This has been proven to reduce pain experience without loss of image quality. In R&D, Sigmascreening collaborates with the Bioengineering and medical Physics department of the Amsterdam UMC (Location AMC).

Project

For ongoing mammography research, Sigmascreening is in need of a neural network image classifier to automatically differentiate between mammograms of a "normal" breast and mammograms of breasts with various deviations, e.g. containing a breast implant or after breast conserving surgery. This project is NOT about detecting breast cancer. The purpose of the classifier is to clean datasets of mammograms from non-standard cases before drawing conclusions on other (image-derived) metrics. A training set is already available.

Profile

Student of technology or engineering (computer, physics, electrical)

- Proven: experience with neural networks classifiers
- Proven: experience with convolutional networks
- Proven: experience with digital image processing
- Ideally: experience with programming in Python
- Ideally: experience with DICOM medical images standard
- Able to work in a team, verbally present ideas & results and write a comprehensive report

Scope

Suitable as an internship or Master thesis-project of a minimum of 20 weeks (can be extended to include more tasks up to a project of 40 weeks)

Contact

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