# BACHELOR PAPER

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# Integrating Assistive Technology (Working title)

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**Schlagworte:** Assistive, Technologie, Software, Integration, Einbindung, Bewegungserkennung, Computer Vision

# Abstract

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**Keywords:** assistive, technology, software, integration, motion recognition, computer vision

# Acknowledgements

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# 1 Introduction

## 1.1 State of the art

### 1.1.1 AT-Frameworks

AsTeRICS is a framework for building AT-Solutions that is based entirely on different plug-ins and their interaction. Possible plug-in types are sensors and actors. It is written in Java, utilizing native C++ libraries where necessary or advantageous.

### 1.1.2 Computer Vision

### 1.1.3 Programming languages

**Java**

Java[2] is a programming language invented by Sun Microsystems, now owned by the Oracle Corporation, which also supports its most prominent implementation. It compiles into non-native Java Bytecode that runs on a Java Virtual Machine (JVM). As a result, any compiled Java Code can run on any hardware that runs such a JVM, making Java almost entirely platform independent.

**C++**

C++ is a programming language defined and standardized by the International Organization for Standardization (ISO)[1]. There are multiple implementations of this standard (each differing slightly), the most prominent ones being as part of the free GNU Compiler Collection project and Visual C++ by iIcrosoft.

**Python**

Python[3] is an interpreted programming language with a simple syntax, partially derived the language "ABC", a simple language with the original purpose of teaching children programming. Despite its simple appearance it is closely tied in with C and C++, with many libraries being direct ports from these programming languages. Prominent examples of this include OpenCV, QT and many more.

This versatility coupled with the easy syntax makes Python a very attractive technology to use for prototyping and scientific computation.

### 1.1.4 Data exchange formats

## 1.2 Combination of existing technologies

# 2 Method

## 2.1 Prerequisites

### 2.1.1 Utilized software

### 2.1.2 Required hardware

## 2.2 Implementation

### 2.2.1 Implementation of Handtracking

**RealSense and OpenCV**

**Gesture recognition**

### 2.2.2 Integration into framework

**Creation of AsTeriCS plugin**

**Java Native Interface**

# 3 Results

## 3.1 Technology integrated

## 3.2 Usage of Asterics

### 3.2.1 Plugin Configuration and Options

### 3.2.2 Tracking and Information Window

# 4 Discussion

## 4.1 Steps for approaching integration

### 4.1.1 Analyzing extensibility concepts

## 4.2 Combining different programming languages

### 4.2.1 Virtues and choosing languages

### 4.2.2 Difficulties and compensation

# Bibliography

[1] INTERNATIONAL ORGANIZATION FOR STANDARDIZATION: *C++ language specification*.

[2] ORACLE CORPORATION: *Java, Official Website*.

[3] PYTHON SOFTWARE FOUNDATION: *Python Programming Language, Official Website*.

# List of Figures

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# List of Abbreviations

**ABC** Alphabet

**WWW** world wide web

**ROFL** Rolling on floor laughing

# A Anhang A

# B Anhang B