Joint Track Machine Learning

Andrew Jensen

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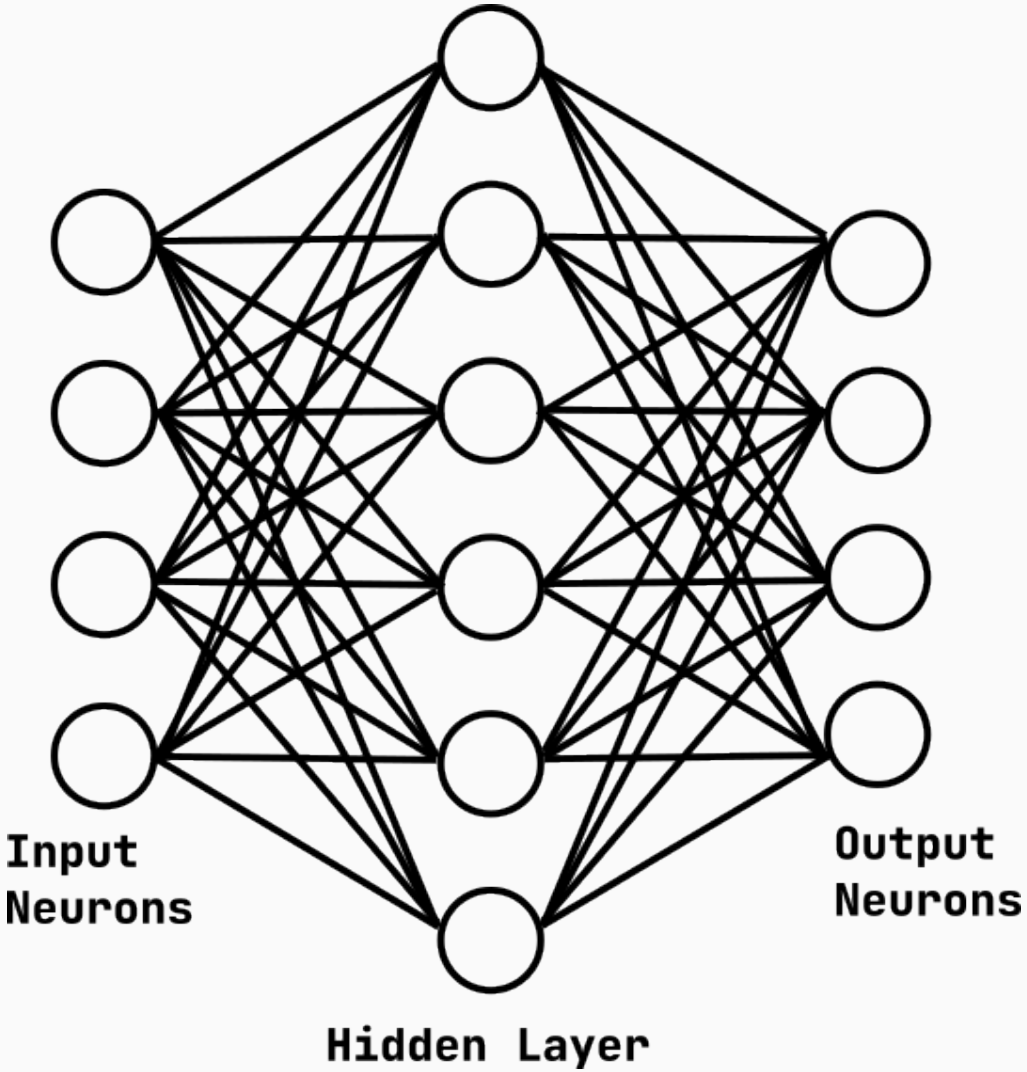
Outline

Introduction

Two columns

- this slide consists of two columns
- the first (left) column has no heading and consists of text
- the second (right) column has an image and is enclosed in an @example@ block



Another frame here

Typing some things here that relate to the research.

$$T = F(s, \theta)$$

Motivation

The Problem

- Joints manifest pain during dynamic activity.
- 20% of patients receiving TKA are dissatisfied.
    - Instability, pain, unnatural [1, 2, 3].
- No reliable method of clinically assessing and quantifying joint dynamics.
    - Too much human supervision, too time consuming

Our Proposition

Orthopaedic surgeons and clinicians would readily adopt a practical and inexpensive technology that allows them to measure a patient's knee kinematics during activities of daily living.

PICTURE HERE WITH RX OF KNEE MOTION STUDY

Constraints

- It must fit within a standard clinical workflow
- The technology must utilize equipment commonly found in hospitals
- There must not be significant human supervision nor interaction to generate an examination report.

Background

Projective Geometry

Camera Intrinsics

Model-Image Registration

Historical Methods

Overview

Many different approaches have attempted to solve the model-image registration problem.

- Pre-computed projections
- Skin-mounted motion Capture
- Biplane Imaging
- Iterative Projections

Pre-Computed Projections

Skin-mounted Motion Capture

Biplane Imaging

Iterative Projections

Model-based Radiostereo Photogrammetry (MBRSA)

Aims

References

References

[1] P. N. Baker et al. "The Role of Pain and Function in Determining Patient Satisfaction After Total Knee Replacement: Data From the National Joint Registry for England and Wales". In: *The Journal of Bone and Joint Surgery. British volume* 89-B.7 (July 2007), pp. 893–900. ISSN: 0301-620X, 2044-5377. DOI: 10.1302/0301-620X.89B7.19091.

[2] Robert B. Bourne et al. "Patient Satisfaction after Total Knee Arthroplasty: Who Is Satisfied and Who Is Not?" In: *Clinical Orthopaedics & Related Research* 468.1 (Jan. 2010), pp. 57–63. ISSN: 0009-921X. DOI: 10.1007/s11999-009-1119-9.

[3] C. E. H. Scott et al. "Predicting Dissatisfaction Following Total Knee Replacement: A Prospective Study of 1217 Patients". In: *The Journal of Bone and Joint Surgery. British volume* 92-B.9 (Sept. 2010), pp. 1253–1258. ISSN: 0301-620X, 2044-5377. DOI: 10.1302/0301-620X.92B9.24394.