Modelling Movement Disorders on the Virtual Research Environment

15-10-2019

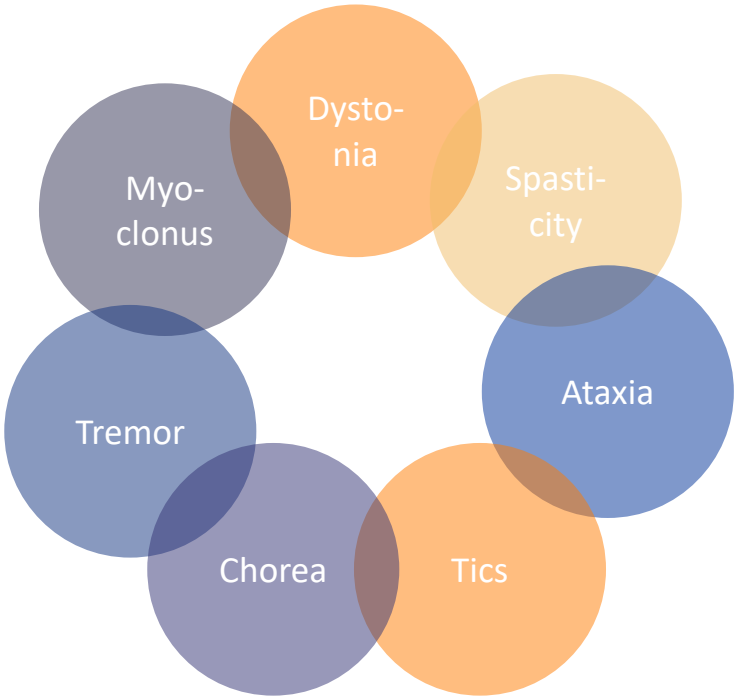
Ioannis Giotis

rijksuniversiteit groningen
umcg
ZIUZ visual intelligence
Movement disorders GRONINGEN
SNN VOOR DE NOORDELIJKE ECONOMIE
Europese Unie
Europees Fonds voor Regionale Ontwikkeling
Research Institute BCN-BRAIN
provinsje fryslân provincie fryslân

Hyperkinetic Movement Disorders

Movement disorders GRONINGEN

- Clinical presentation
  - Complex
  - Mixed
  - Functional
- Classification = expert opinion
- Large inter- and intra-observer variability
- Major problems:
  - Diagnosis
  - Tailored treatment
  - Evaluation of treatment effect



NEMO

Movement disorders
GRONINGEN

- Goal 1: **To develop novel and integrated methods to phenotype involuntary movements using**
  - **3D video cameras;**
  - **motion sensors;**
  - **muscle electrodes.**

- Goal 2: **To develop a computer aided diagnostic tool to classify hyperkinetic movement disorders**

umcg

ZIUZ.
visual intelligence

NEMO: data modalities

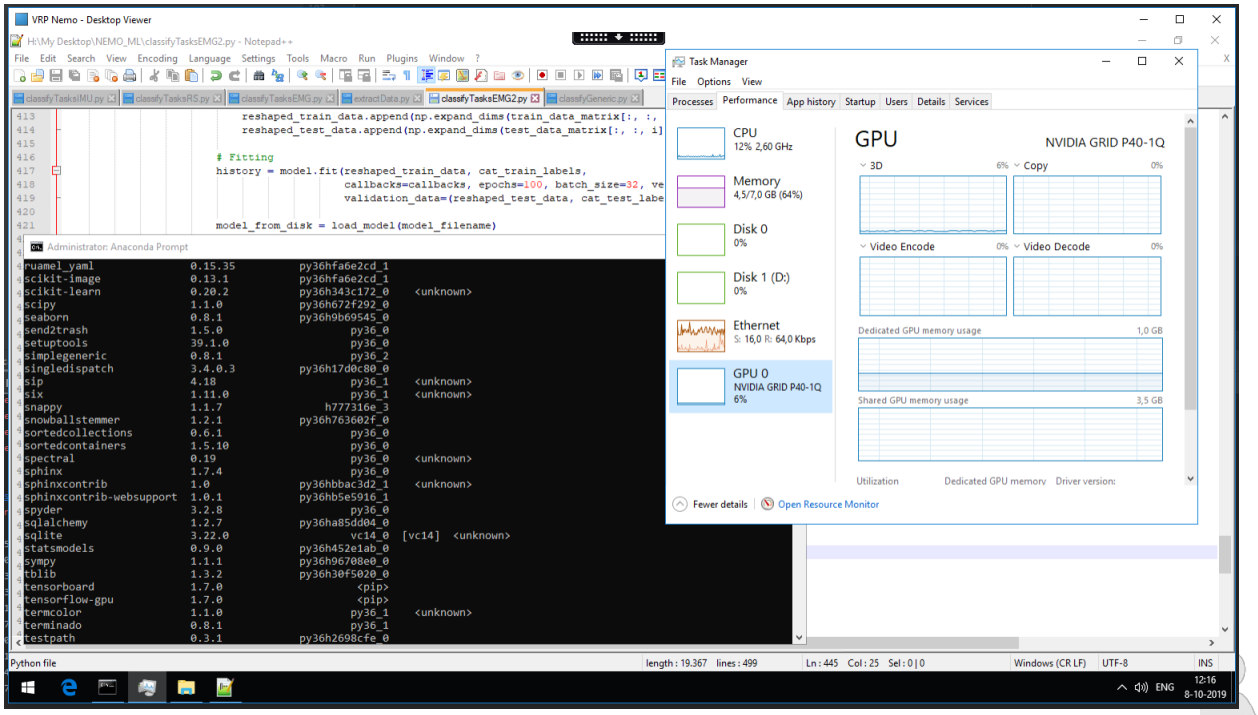
Movement disorders
GRONINGEN

- 3D video cameras;
- motion sensors;
- muscle electrodes.

Virtual Research Workspace

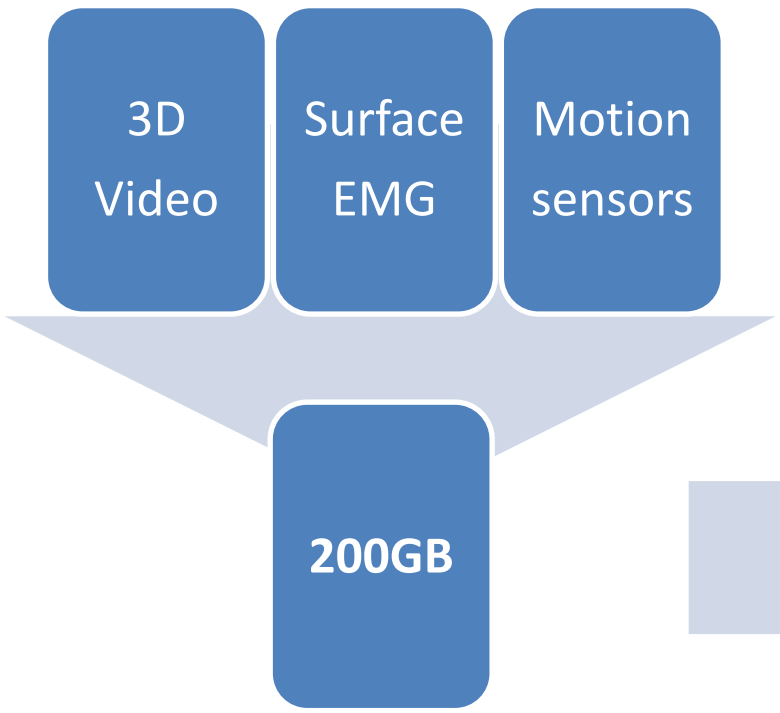
Movement disorders
GRONINGEN

- Intel Xeon CPUs / 8 GB RAM
- GPU processing capabilities;
- Python 3 + Data analytics / Machine learning libs
- SFTP

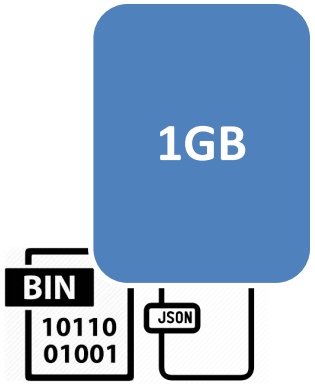


Feature extraction from patient data

Movement disorders GRONINGEN

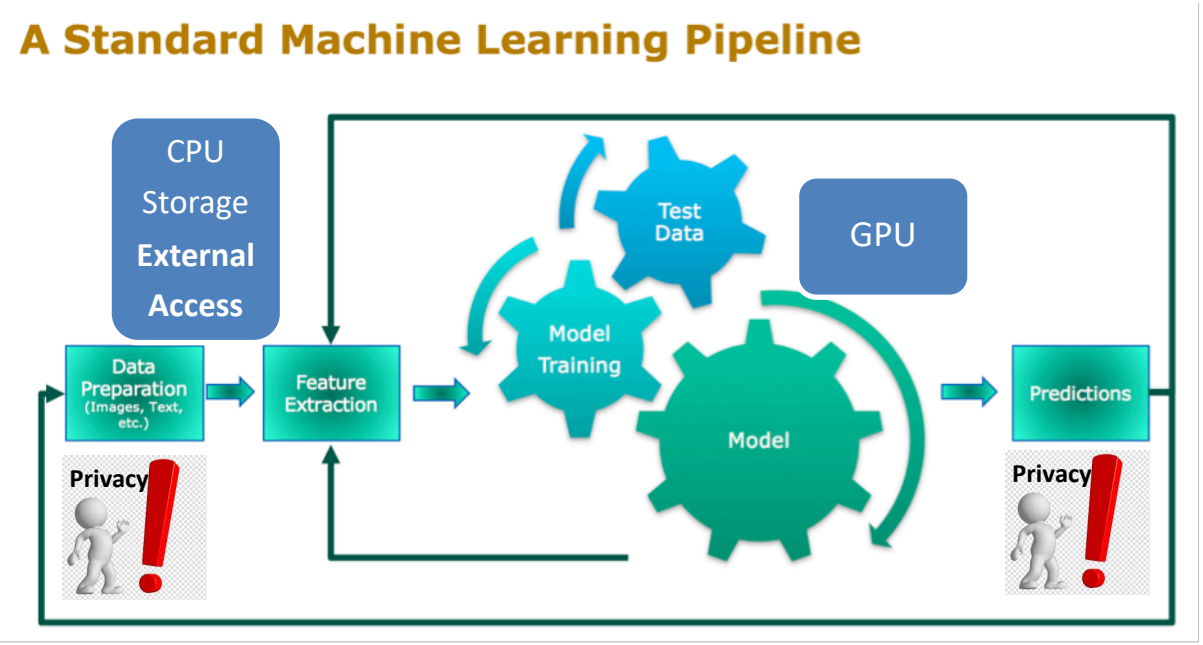


- Repeated multiple times
  - Different parameters
  - Different purposes
- RAM is often a challenge



Building a Machine Learning pipeline

Movement disorders
GRONINGEN



Security vs Usability

Movement disorders
GRONINGEN

- VRW roles and rights set a strict but clear security framework
  - Federated account - separate project environments
  - Multifactor authentication via mobile phone
  - Upload - no download
- Challenges
  - No easy access for users outside the organisation
  - Updating data analysis environment inefficient
  - No internet access -> no online resources on the fly

Outlook

Movement disorders
GRONINGEN

- More self-management
  - Data sharing
  - Configuration of tools and apps
- More connectivity
  - (Limited) internet access
- More project management
  - Planning
  - Shared documents / version control
  - Tasklists / workflows
- …more processing power