Who am I? Dmytro (Dima) Fishman  
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Education

<table>
<thead>
<tr>
<th>Degree</th>
<th>Institution</th>
<th>Years</th>
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<tbody>
<tr>
<td>BSc</td>
<td>KTH</td>
<td>2007-2011</td>
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<td></td>
<td>University of Tartu</td>
<td>1918-2013</td>
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<tr>
<td>MSc</td>
<td>University of Tartu</td>
<td>2011-2013</td>
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<tr>
<td>PhD</td>
<td>University of Tartu</td>
<td>2013-2021</td>
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</tbody>
</table>

Teaching experience

- Assistant Professor in Artificial Intelligence
- Instructor of Machine Learning course
- Instructor of Advanced Machine Learning and Time Series Modelling course
Dmytro Fishman
Group I
(Monday @ 12:15, 1019)
dmytro.fishman@ut.ee

Tetiana Rabiichuk
Group II
(Monday @ 12:15, 2034)
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Tetiana Shtym
Group III
(Tuesday @ 16:15, 2034)
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Mohammed Ali
Group IV
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Group V
(Wednesday @ 16:15, 2034)
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Taavi Luik
Group VI
(Wednesday @ 16:15, 1022)
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This course aims to provide an introduction

More “meat” will be given in other courses
Machine Learning
(course roadmap)
Now you are ready for real-life tasks
Supervised Learning
Unsupervised Learning
Performance metrics
Deep Learning
Ensemble learning
Other

Overview of ML
Artificial neuron
Forward path
Activation Functions
Gradient descent
Backpropagation algorithm
Vanishing Gradients
Convolutional NNs
Gradient descent
Activation Functions
Training loop
Data augmentation
L1 & L2 regularisation
Lasso regression
Weight decay
Dropout
Basic ensembling
Bagging
Random Forest
Boosting
Stacking & Blending
Accurancy
Recall, precision
Confusion matrix
MSE & RMSE
ROC & AUC

Now you are ready for real-life tasks
Now you are ready for real-life tasks
Supervised Learning
Unsupervised Learning
Performance metrics
Deep Learning
Ensemble learning
Other

Nearest Neighbour Classifier
Linear regression
Decision trees
Overfitting
Train/val split
Classification vs regression

K-nearest neighbors
T-SNE
UNAP
PCA
Data preprocessing
Model implementation
Model selection

Algorithm
Model selection
Model implementation
Data preprocessing
Classification vs regression

Accuracy
MSE & RMSE
Recall, precision
F1-score
Confusion matrix
ROC & AUC

Six homeworks (10 points each)

Now you are ready for real-life tasks
Now you are ready for real-life tasks
Supervised Learning
Unsupervised Learning
Performance metrics
Deep Learning
Ensemble learning
Other
Nearest Neighbour
Classifier
Linear regression
Decision trees
Overfitting
Tran/val split
Cross Validation
Algorithm
Model selection
Model implementation
Data preprocessing
Classification vs regression
K-means
Hierarchical clustering
DBSCAN
PCA
T-SNE
UMAP
Accuracy
MSE & RMSE
Recall, precision
F1-score
Confusion matrix
ROC & AUC
Guest talk
Concluding remarks
Final presentations
Now you are ready for real-life tasks
Overview of ML
Course organisation
Hierarchical clustering
K-means
T-SNE
UNAP
PCA
Data preprocessing
Implementing
Algorithm
Model selection
Model implementation
Data preprocessing
Classification vs regression
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Overview of ML

Course organisation

Nearest Neighbour Classifier

Supervised Learning

Unsupervised Learning

Linear regression

Unsupervised Learning

Decision trees

Performance metrics

Overfitting

Deep Learning

Tran/val split

Ensemble learning

Confidence scores

Other

Classification vs regression

Model selection

Model implementation

Data preprocessing

Classification

Algorithm

Algorithm

Data

Linear regression

Accuracy

Nearest Neighbour

Model

Overview of ML

Classifier

DBSCAN

H1

T-SNE

K-means

Hierarchical clustering

Hierarchical clustering

UMAP

T-SNE

PCA

Basic ensembling

DBSCAN

Artificial neuron

Forward path

Gradient descent

Convolutional NNs

Gradient descent

Activation Functions

Training loop

Dropout

Weight decay

Ridge regression

Dropout

Data augmentation

Weight decay

Ridge regression

L1 & L2 regularisation

Vanishing Gradients

Lasso regression

Regularisation

Convolutional NNs

Regularisation

Regularisation

Now you are ready for real-life tasks

Now you are ready for real-life tasks

Final presentations

Final presentations

Project in a team (25 points)

Project in a team (25 points)
Now you are ready for real-life tasks.
How this course will work (general information)
How this course will work (general information)

• Modules are for lectures and practice sessions

• All deadlines are **hard deadlines**, but you have 6 **late days** to submit without **penalty**

• Penalty is **-20%** from the max grade for the assignment for each extra late day.

• Attendance is **not compulsory**

• There is **no exam** (hurrah!)
How this course will work (late days)

• E.g. you are late for an assignment

• you need to notify TAs that you want to use X late days (in comments to submission)

• Otherwise, they are going to apply a penalty by default (-20% for each day you’re late)
How this course will work (grading)

• Max 100 points

• 6 homeworks, 10 points each (60 points)  
  (plenty of bonus points will be available)

• 1 paper summary (15 points)

• Project (25 points)

• As usual A starts from 91, B from 81 etc.
# Deadlines

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Date of assignment</th>
<th>Deadline (midnight 23:59)</th>
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<tbody>
<tr>
<td>HW1</td>
<td>Sep 6</td>
<td>Sep 19</td>
</tr>
<tr>
<td>HW2</td>
<td>Sep 20</td>
<td>Oct 3</td>
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<tr>
<td>HW3</td>
<td>Oct 4</td>
<td>Oct 17</td>
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<tr>
<td>Paper summary</td>
<td>Oct 11</td>
<td>Oct 24</td>
</tr>
<tr>
<td>HW4</td>
<td>Oct 18</td>
<td>Oct 31</td>
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<tr>
<td>HW5</td>
<td>Nov 1</td>
<td>Nov 14</td>
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<tr>
<td>HW6</td>
<td>Nov 22</td>
<td>Dec 5</td>
</tr>
<tr>
<td>Project</td>
<td>TBA</td>
<td>Dec 13 - 15</td>
</tr>
</tbody>
</table>

*All deadlines are subject to change, check out CampusWire and website for updates*
How this course will work (communication)

• Course **webpage**:
  • https://courses.cs.ut.ee/2021/ml/fall

• Course **forum** in **CampusWire**:
  • https://campuswire.com/p/GFC2094F2 + 6354
How this course will work (homeworks)

• **6** homeworks (10 points each) in Colaboratory

• Per task **feedback** from the TAs

• Export **.ipynb** files from Colaboratory and submit via the course

• Generally, if you submit **after 23:59**, it is considered **1 day** over the deadline, mind you step.
How this course will work (paper review)

• **Learn** to perform in **depth review** of someone else’s work

• We will provide a **list of papers** to choose from

• Summarise the main messages, try to grasp the main idea, its pros and cons

• **Up to 2 pages**
How this course will work (project)

- **Learn** ML from trenches
- Teams of size **3 - 4 students**
- We will announce a call for projects soon
- Also you will be given an opportunity to propose your idea
- You will present an **intermediate progress** in **November**
- The **final presentation** will be held in **December**
How this course will work (COVID19)

Lectures  Practice sessions
How this course will work (COVID19)

Lectures

Practice sessions
How this course will work (COVID19)

Lectures

Solely online

Practice sessions

+ Offline sessions
How this course will work (COVID19)

Lectures

Solely online

Practice sessions

+ Offline sessions

All lectures and one practice session per week will be recorded and uploaded to the course website.
How to pass this course

• Be kind and nice person

• Get at least **51 point** overall

• Get at least **50%** from homeworks and project
  (at least **30 points** from homeworks, **12** from project)
In this course we will practice student-oriented approach
Code of conduct

We value the involvement of everyone in the community. We are committed to creating a friendly and respectful place for learning, teaching and contributing. All participants in our classes are expected to show respect and courtesy to others.
Plagiarism is not tolerated

First time caught, we subtract exercise points from your homework
Second time - notification to Dean’s office
We actually will run checks to see if you respect this.