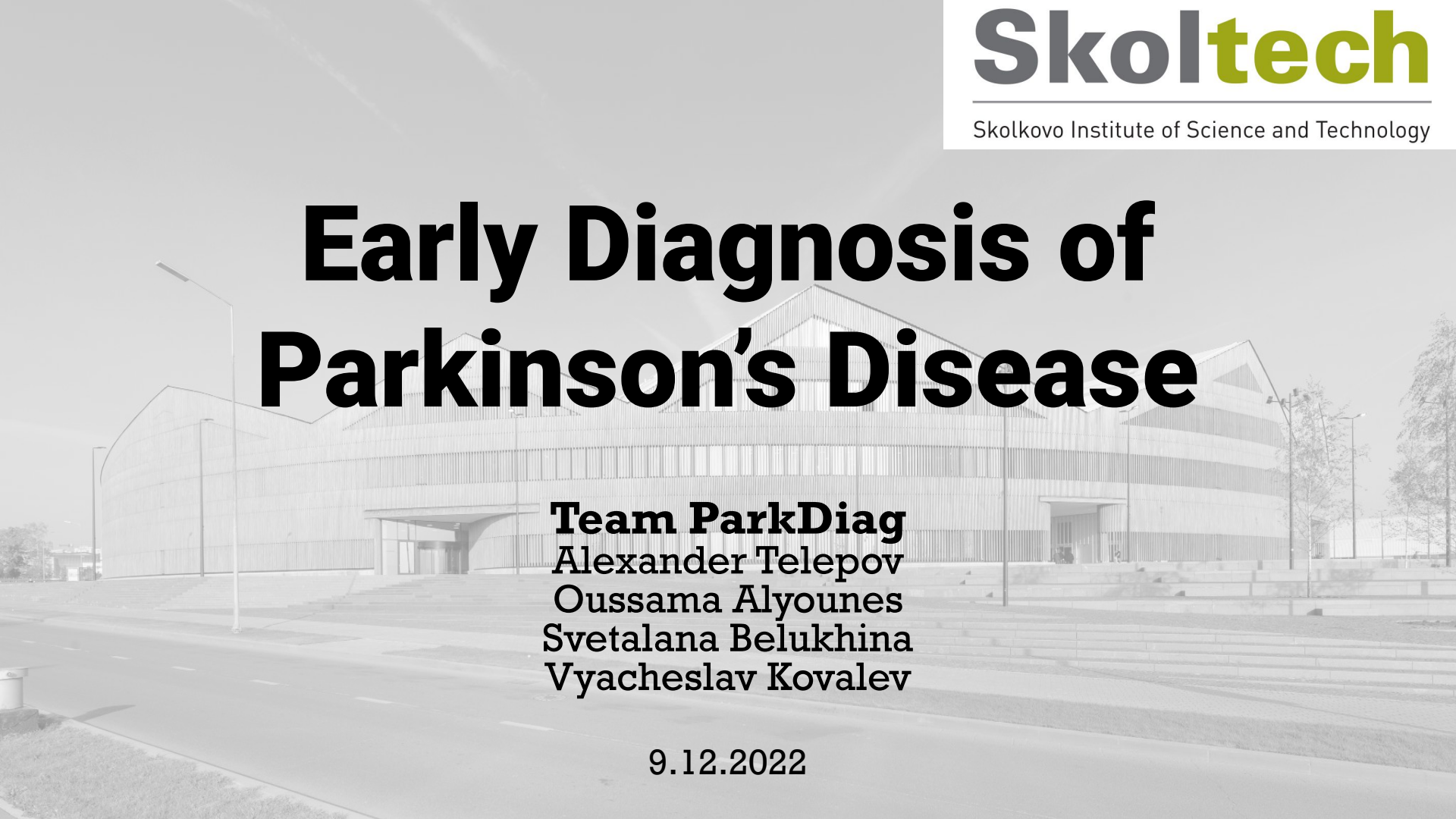

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Early Diagnosis of Parkinson's Disease

Team ParkDiag
Alexander Telepov
Oussama Alyounes
Svetalana Belukhina
Vyacheslav Kovalev

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Medical Device Description

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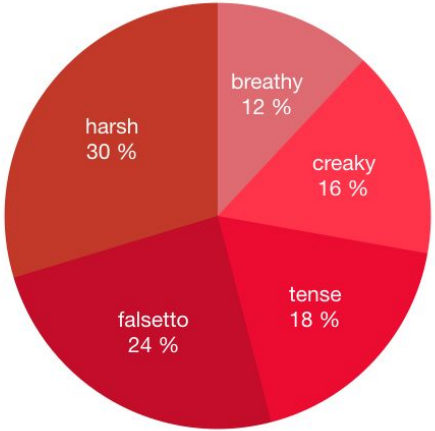
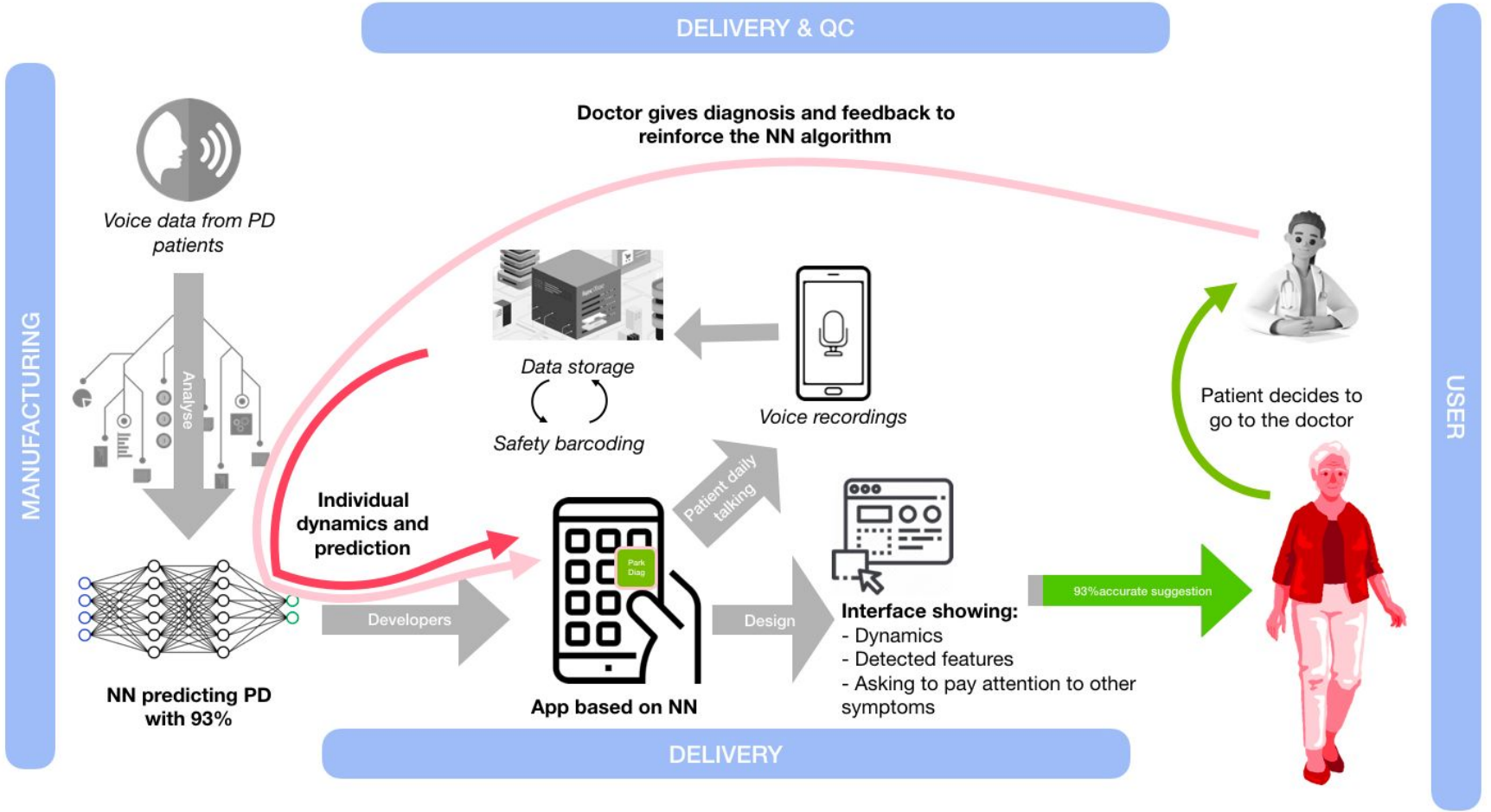
- Our software **“ParkDiag”** is capable of **early diagnosing** of **Parkinson’s disease** through **voice** recordings.
- **“ParkDiag”** guarantee at least **94.84% accuracy** **for early diagnosis of PD** while **usual methods** guarantee **less than 75%**.
- **Easily installed on your smartphone.** With high technology depends on **5 voice features** (Harsh, falsetto, tense, crikey, breath).
- **Save your loving grandmother** with accuracy of **99% with female above 60 years**.



[1] J. Rusz, R. Cmejla, H. Ruzickova, E. Ruzicka, Quantitative acoustic measurements for characterization of speech and voice disorders in early untreated Parkinson’s disease, J. Acoust. Soc. Am. 129 (1) (2011) 350–367.
[2] Cernak, Milos, et al. "Characterisation of voice quality of Parkinson’s disease using differential phonological posterior features." Computer Speech & Language 46 (2017): 196-208.
[3] Ngo QC, Motin MA, Pah ND, Drotár P, Kempster P, Kumar D. Computerized analysis of speech and voice for Parkinson's disease: A systematic review. Comput Methods Programs Biomed. 2022 Nov;226:107133. doi: 10.1016/j.cmpb.2022.107133. Epub 2022 Sep 16. PMID: 36183641..

MANUF/DELIVERY Block Diagram



MANUF/DELIVERY Core Equipment

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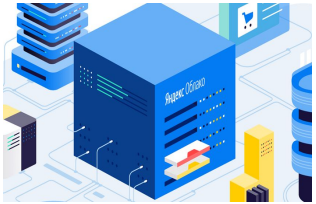
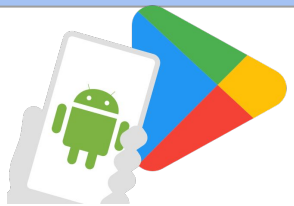
Key assets and technologies

Analytic Tool	Cloud Service	Android Application
		
100.000$ (5 DL-engineers, 4 month)	5.000$ (per month)	15.000$
Datalytica	Yandex	WINFOX

Model:

- As we have only 2 junior data scientist, **we can only do POC**
- To design reliable(explainable), efficient and fast model we need **outsource**
- End-2-end design can pour out to **3-5 month full-time** work

App:

- Should be handy, have nice interface, optimized
- In other cases **it wouldn't be used**

Team ParkDiag

Device Validation Protocol

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Performance validation	Tech-side validation	User validation
Input control. Voice/Signal validation	Server control	

1) Noize recognition - SNR might be more that 25dB
2) Voice quality - voice text have to give more than 75% word matches with text on screen. SpeechAPI - API for this purpose

1) Accuracy tests based on DS [1][2][3]
2) Response time. Queues problem solution is Yandex cloud
3) Server connection test
4) Data Validation method

1) Up to date version control check
2) Log user activity
3) Cross-platform app development framework

[1] Parkinson Speech Dataset with Multiple Types of Sound Recordings Data Set https://archive.ics.uci.edu/ml/datasets/Parkinson+Speech+Dataset+with++Multiple+Types+of+Sound+Recordings
[2] Parkinsons Data Set https://archive.ics.uci.edu/ml/datasets/parkinsons
[3] Animal Sound Archive https://www.gbif.org/dataset/b7ec1bf8-819b-11e2-bad2-00145eb45e9a

Team Role

Skoltech
Skolkovo Institute of Science and Technology

Belukhina Svetlana

Life Science MOA+POC

Oussama Alyounes

SES, QC and patent

Kovalev Vyacheslav

Manuf + QC

Telepov Alexander

DS, Preclin+Reg+Clin