Non-invasive system for facilitating the medical diagnosis of stenosis or other pathology of non-carotid vasculature.

Inventors: Justin Baraboo, Sherwin Chan

The Innovation: Systems and computer implemented methods for detecting and evaluating flow of biological fluids in the body, and in particular facilitating medical diagnoses of pathologies such as stenosis or other pathology of a hepatic artery or other non-carotid vasculature by using machine learning to analyze a spectral Doppler ultrasound waveform of blood flow.

Background:

Arterial stenosis is the cause of peripheral arterial disease in the elderly, diabetics and smokers. Arterial stenosis is also one of the most common causes of early transplant failure is arterial stenosis of the anastomotic junction between the donor and the recipient. Early detection of transplant arterial stenosis can help prevent transplant failure and the need to re-transplant. Conventional angiography is the definitive test, but is expensive and invasive and the imaging contrast agent can be nephrotoxic and/or trigger immune reactions.

Advantages and Potential Applications:

- Provides an accurate quantitative screening method to facilitate the medical diagnosis of stenosis

- Has been shown to decrease the number of false positive US screens in a challenging dataset. This would result in fewer diagnostic conventional angiography exams, which are expensive and invasive

- Can be applied to hepatic and other non-carotid vasculature

Children's Mercy
KANSAS CITY

- System is fully automated and can give the radiologist a probability of stenosis being present.

- Also provides the radiologist with an explanation for the probability estimate, so that the radiologist can decide what to do in cases of disagreement.

Status: United States, Japan, EPO and Canada Patent applications filed September 2020.

Related Publications:

Automated Prediction of Hepatic Arterial Stenosis. Baraboo JJ, Dinakarpandian D, Chan SS. *AMIA Summits on Translational Science Proceedings*. 2017; 2017:58-65.

The Sonographic Stenosis Index: A new specific quantitative measure of transplant hepatic arterial stenosis. J Ultrasound Med. Le, et.al., 2017 Apr;36(4):809-819.

Licensing: Children's Mercy, Kansas City seeks to have discussions with companies that are interested in licensing and/or research collaborations.

Contact: TechTransfer@cmh.edu
            mimolina@cmh.edu

Test characteristics:

Comparison between machine learning algorithm and traditional clinical criteria using multiple validation tests on a challenging dataset
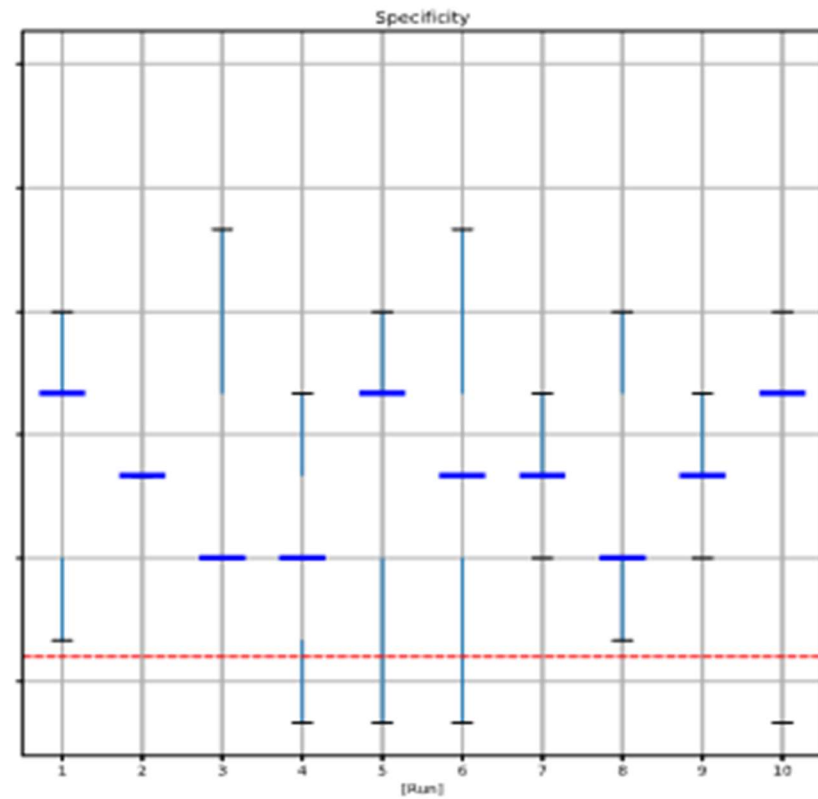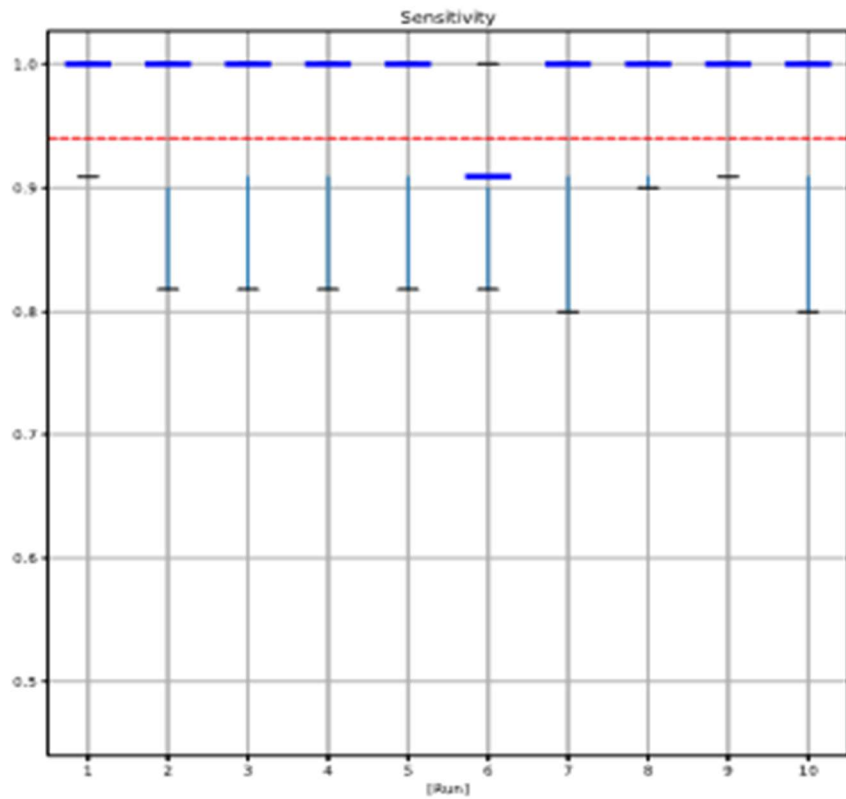
Blue is machine learning algorithm and red is standard of care.

Example explanation figures: